



## **LP9802 Installation and Reference Manual**

### **Table of Contents**

#### **Installation**

[Compatibility/Prerequisites](#)

[Set Jumpers](#)

[Install HBA](#)

[Attach Media](#)

[Apply Power](#)

[View LEDs](#)

#### **Reference**

[Specifications](#)

[FCC and Regulatory Notices](#)

[Declaration of Conformity](#)

[Laser Safety](#)

# **Chapter 1 – Installation**

## **Table of Contents**

.....	<a href="#">Compatibility</a>
.....	<a href="#">Prerequisites</a>
.....	<a href="#">Set Jumpers</a>
.....	<a href="#">Install HBA</a>
.....	<a href="#">Attach Media</a>
.....	<a href="#">Apply Power</a>
.....	<a href="#">View LEDs</a>

## Installation

**Caution** Emulex LightPulse ® Host Bus Adapters (HBAs) contain electronic components that can be damaged by static electricity through an electrostatic discharge (ESD) event. To prevent ESD damage, maintain constant contact with any grounded metal surface. A grounding wrist strap is useful for this purpose. Handle the card carefully at all times and preferably by the edges. Avoid touching electronic components and keep the card in the original packaging until you are ready for installation.

## Compatibility

<b>Software Environments</b>	Windows Server 2003, Windows 2000, Windows NT, HP-UX, Linux, NetWare, Solaris, AIX
<b>Hardware Environments</b>	PCI hardware platforms: x86, SPARC, PowerPC, RS6000 or HP9000

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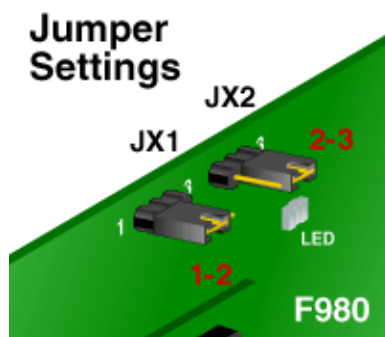
## Prerequisites

- Host computer must provide 3.3 VDC bus power
- One open 32-bit or 64-bit (64-bit recommended) PCI or PCI-X bus slot.
- PCI bus clock rate of 33 MHz or 66 MHz
- PCI-X bus clock rate of 66 MHz, 100 MHz, or 133 MHz
- Media and connectors

## Set Jumpers

The host adapter has two jumper blocks (JX1, JX2) that control the host adapter's device ID. The default device ID is F980.

Device ID	Jumper setting
F980	JX1:1-2, JX2:2-3
1AE5	JX1:2-3, JX2:2-3
F981	JX1:2-3, JX2:1-2



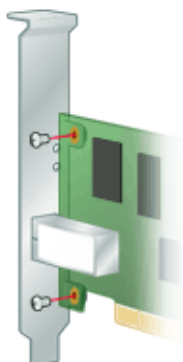
## Install the Host Bus Adapter Board

1. Record IEEE and serial numbers.

Each host bus adapter is shipped with a unique 64-bit identifier called the IEEE address. The Fibre Channel industry uses a World Wide Name (WWN) derived from the IEEE address, and this number is needed for Fibre Channel connectivity. The serial number is used when communicating with Emulex. Both numbers are clearly marked on the board. We recommend that you record these numbers before installation.

2. Turn off and unplug the computer.
3. Remove the computer case.
4. Remove the blank panel from an empty 32- or 64-bit PCI or PCI-X bus slot. Compare the removed panel to the bracket on the host bus adapter. Follow steps 5–8 to change the bracket if they are different sizes.

**Note** The host bus adapter comes with a standard PCI bracket installed. The low-profile mounting bracket is shorter than the standard bracket; approximately 3.11 in. (7.9cm) compared to 4.75 in. (12.06 cm) long.



5. Remove the mounting bracket screws from the top of the host bus adapter.
6. Remove the bracket and store it for future use.
7. Align the new mounting bracket tabs with the holes in the HBA.

**Note** Be careful not to push the bracket past the transceiver housing's grounding tabs.

8. Replace the screws that attach the HBA to the bracket.
9. Insert the host bus adapter into the empty 32- or 64-bit PCI or PCI-X bus slot. Press firmly until it is seated.

10. Secure the host bus adapter's mounting bracket to the case with the panel screw or clip.
11. Replace the computer case and tighten case screws.

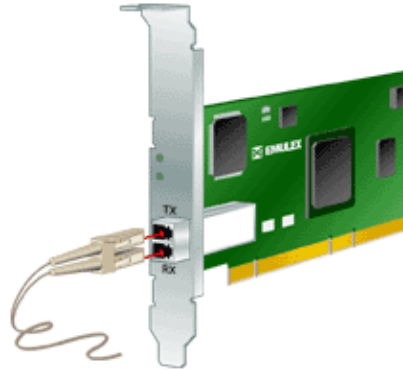
The host bus adapter is now installed in the PC and is ready for media attachment.

## Attach Media

**Note** The host bus adapter will not allow normal data transmission on an optical link unless it is connected to another similar or compatible laser product (that is, multimode to multimode.)

Use multimode or single mode fiber optic cable used with short- and long-wave lasers and that adheres to the following specifications:

Fiber Optic Cable	Maximum Length	Minimum Length	Connector
62.5/125 $\mu\text{m}$ (multimode)	300 meters at 1.0625 Gb/s 150 meters at 2.125 Gb/s	2 meters	LC
50/125 $\mu\text{m}$ (multimode)	500 meters at 1.0625 Gb/s 300 meters at 2.125 Gb/s	2 meters	LC
9/125 $\mu\text{m}$ (single mode)	10,000 meters at 1.0625 Gb/s 10,000 meters at 2.125 Gb/s	2 meters	LC



1. Connect the fiber optic cable to the LC connector on the HBA.
2. Connect the other end of the cable to the Fibre Channel device.

After the media is connected to the host bus adapter, you are ready to apply power to the computer.

## Apply Power

1. Verify that the host bus adapter is securely installed in the computer.
2. Verify that the correct media is attached.
3. Plug in and turn on the computer.
4. Observe LEDs for Power On Self Test (POST) results.

## View LEDs

Green and yellow display lights (LEDs) can be seen through openings in the host bus adapter's mounting bracket. Green indicates power and yellow signifies port activity.

POST conditions and results are summarized in this table.

<b>Green LED</b>	<b>Yellow LED</b>	<b>State</b>
OFF	OFF	Wake-up failure (dead board)
OFF	ON	POST failure (dead board)
OFF	Slow blink (1 Hz)	Wake-up failure (dead board)
OFF	Fast blink (4 Hz)	Failure in POST (dead board)
OFF	Flashing (irregular)	POST processing in progress
ON	OFF	Failure while functioning
ON	ON	Failure while functioning
ON	Slow blink (1 Hz)	Normal – 1 Gb link rate
ON	Fast blink (4 Hz)	Normal – 2 Gb link rate
Blink (1 Hz)	OFF	Normal – link down or not yet started



## **Chapter 2 – Reference**

### **Table of Contents**

- [Specifications](#)
- [FCC and Regulatory Notices](#)
- [Declaration of Conformity](#)
- [Laser Safety](#)

## Reference

### Specifications

Parameter	Range
<b>Media Interface</b>	The Pegasus ASIC interfaces to the physical media through an FC-0 Media Interface (FC-PI compliant transceiver), and then connects through an optical fiber LC connector.
<b>Physical Dimensions</b>	<p>The PCI adapter accommodates two form factors:</p> <ul style="list-style-type: none"> <li>• The short PCI form factor, 6.875 inches by 4.2 inches, with a full-height bracket</li> <li>• The low-profile MD2 form factor, 6.600 inches by 2.536 inches, with a low-profile bracket.</li> </ul>
<b>Power Requirements</b>	+ 3.3 VDC, + or – 5 % , 2.3A typical (3.3A maximum)
<b>Airflow</b>	100 lf/min (minimum)
<b>Temperature</b>	32° to 113° F (0° to 45° C), Operating –40° to 158° F (–40° to 70° C), Storage
<b>Humidity</b>	5% to 95% non-condensing
<b>Agency Approvals for LP9802</b>	<p>Class 1 Laser Product per DHHS 21CFR (J) &amp; EN60825            UL recognized to UL1950            CUR recognized to CSA22.2, No.950            Baurt-certified by TUV to EN60950            FCC Rules, Part 15, Class A            Industry Canada, ICES-003, Class A            EMC Directive 89/336/EEC (CE Mark)            EN55022, Class A            EN55024            Australian EMC Framework (C-Tick Mark)            AS/NZS 3548: Class A            Japan VCCI, Class A</p>

## FCC and Regulatory Notices

CLASS 1 LASER PRODUCT  
LASER KLASSE 1  
LUOKAN 1 LASERLAITE  
APPAREIL A` LASER DE CLASSE 1

### Model LP9802-F2/LP982-F2/LP9802DC-F2

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Shielded cables must be used between this equipment and attached peripheral devices. The reader is cautioned that changes or modifications made to the equipment not expressly approved by Emulex could void the user's authority to operate this equipment. The above statement applies to products marketed in the USA

This class A digital apparatus meets all requirements of the Industry Canada (IC) Interference – Causing Equipment Standard (ICES-003).

Cet appareil numerique de la Classe A respecte toutes les exigences du reglement sur le materiel brouilleur du Canada.

This statement applies to products marketed in Canada.

Responsible Party: Paul Folino, CEO, Emulex Corporation, 3535 Harbor Blvd., Costa Mesa, CA 92626, USA, (714) 662-5600

### VCCI Notices and Translations (Japan Only)

**Note** VCCI regulations provide that changes or modifications not expressly approved by Emulex Corporation could void your authority to operate this equipment.

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用する  
と電波妨害をうき起こすことがあります。この場合には使用者が適切な対策  
を講ずるよう要求されることがあります。

**VCCI—A**

Translation:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. VCCI—A

### Manual Notice

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Translation:


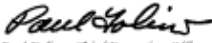
This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

## Declaration of Conformity

### LP9802-F2/X2 / LP982-F2 (2x5 SFF models) / LP9802DC-F2

**Note** Changes or modifications not expressly approved by Emulex Corporation could void the user's authority to operate this equipment. This equipment complies with CISPR22/EN55022 Class A.

**Warning** This is a class A product. In a domestic environment, this product may cause radio interference requiring the user to take adequate measures.

 <b>DECLARATION OF CONFORMITY</b>	
<b>Manufacturer:</b>	Emulex Corporation 3535 Harbor Blvd. Costa Mesa, California 92626 USA
<b>declares under sole responsibility that the product:</b>	
<b>Product Name:</b>	LightPulse™ Fibre Channel PCI Host Bus Adapter
<b>Models:</b>	LP9802-F2/X2, LP982-F2, LP9802DC-F2
<b>Assembly Number:</b>	FC1020042-XX (FC1010489-XX) – PCI-X, Single Channel SFF model FC1020050-XX (FC1010491-XX) – PCI-X, Dual Channel SFF model
<b>To which this Declaration relates is in conformity with the following standards or other documents for Information Technology Equipment (ITE):</b>	
<b>Product Safety:</b>	UL Recognized to UL1950 CUR Recognized to CSA22.2, No. 950 IEC 950 (1991) + Amendments 1,2,3,4, and 11 EN 60950 (1992) + Amendments 1,2,3,4, and 11 EN 60825-1 (1994) + Amendment 11 EN 60825-2 (1994) CFR Title 21, Laser AEL Class 1, FDA/CDRH
<b>EMC:</b>	FCC Rules, CFR Title 47, Part 15, Subpart B, Class A Industry Canada, ICES-003, Class A EN55022 (1998) / CISPR 22 (1997) Class A EN55024 (1998) AZ/NZS 3548:1995, Class A VCCI, Class A
<b>Supplementary Information:</b>	1. The Product was tested in a typical configuration. 2. The product complies with the requirements of the following directives: <ul style="list-style-type: none"> <li>European Union Low Voltage Directive 73/23/EEC</li> <li>European Union EMC Directive 89/336/EEC (as amended by 92/31/EEC)</li> <li>CE-Marking Directive 93/68/EEC (Carries the CE-Mark accordingly)</li> <li>Australian EMC Framework (Carries the C-Tick mark accordingly)</li> </ul>
October 29, 2002 Costa Mesa, CA.	 Paul Folino, Chief Executive Officer
<b>European Contact:</b>	Emulex Corporation 7 & 8 Forest Court Oaklands Park Pulborough Road Wokingham, Berkshire RG41 3PD, England Telephone: 44-118-977-2929 Fax: 44-118-977-3237

## Laser Safety Notice

This laser safety information contains certification and product information covering laser products known as optical Gigabaud Link Modules (GLMs), Gigabit Interface Converters (GBICs), 1x9 and small form factor transceivers sold as accessories to or incorporated in Emulex LightPulse host adapters. The GLM, GBIC, 1x9 and small form factor transceiver are the primary cable connection mechanisms for any optical port on the host adapter and hub. This data is not intended to be a replacement for any safety regulations and standards; relevant safety documents should always be consulted if necessary. Contact Emulex Corporation with any questions or concerns about laser safety.

[Certification and Classification](#)

[Labeling Requirements](#)

[Product Information](#)

[Usage Restrictions](#)

[System Level Certification](#)

### Certification and Classification

LP6000 and LP7000E PCI host adapters may contain a laser product known as an optical Gigabaud Link Module (GLM). The optical GLM is attached to the host adapter using an 80-pin connector and extends through the mounting bracket. In turn, the host adapter can be inserted into any host system's PCI slot.

The LH5000 hub may contain a laser product known as a Gigabit Interface Connector (GBIC). The GBIC provides the physical connector to the optical cable. The GBIC can be inserted into any pluggable hub port.

The LP8000, LP850 and LP9000 PCI host adapter may contain a laser product known as a Gigabit Interface Converter (GBIC) or an embedded 1x9 transceiver. The GBIC and or 1x9 transceiver provide the physical connection to the optical cable, and its SC-style connector extends through the mounting bracket. In turn, the host adapter can be inserted into any host system's PCI slot.

The LP9002, LP9002L, LP952L, LP9002S, LP9002DC, LP9002C, LP9202C, LP9402DC, LP9802, LP982 and LP9802DC PCI host adapters may contain a laser product known as a small form factor transceiver. This transceiver provides the physical connection to the optical cable, and its LC-style connector extends through the mounting bracket. In turn, the host adapter can be inserted into any host system's appropriate PCI/PCI-X/cPCI/SBus expansion slot.

In the United States, all optical GLMs, GBICs, 1x9 and small form factor transceivers sold by Emulex are certified as Class 1 laser products that

conform to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR subchapter J. The certification is indicated by a label located on the optical GLM, GBIC, 1x9 or small form factor transceiver.

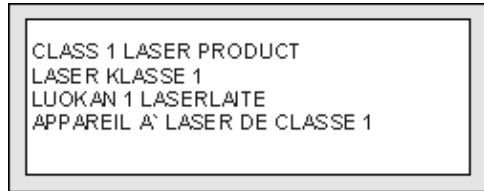
In Europe, all optical GLMs, GBICs, 1x9 and small form factor transceivers sold by Emulex are certified as Class 1 laser component assemblies that conform to the requirements contained in the CENELEC (European Committee for Electrotechnical Standardization) standard EN60825–1:1994 (including amendment 11) and EN60825–2:1994. GLMs, GBICs, 1x9 and small form factor transceivers are certified by a recognized European testing agency and have appropriate markings on the assembly. The DHHS conformity label and European conformity mark will not be visible externally once the optical GLM, GBIC, 1x9 or small form factor transceiver is connected to or inserted in the host adapter and the adapter is installed into a system.

### Labeling Requirements

No caution or danger labels are required for use of the GLM, GBIC, 1x9 or small form factor transceiver since they are Class 1 laser component assembly. In the U.S., the only laser safety label required is the DHHS certification label that already appears on the GLM, GBIC, 1x9 and small form factor transceiver. In Europe, the EN60825–1/EN60825–2 standards require that the system–level product has a Class 1 information label permanently attached and clearly visible whenever access to the GLM, GBIC, 1x9 and small form factor transceiver optical port is possible. Each Class 1 product shall have affixed an explanatory label bearing the words:



Alternatively, at the discretion of the manufacturer, the same statement may be included in user information. If a label is used, an example of the IEC Class 1 information label that is suitable for most European countries is shown below. The label consists of black printing on a white background. Languages represented on this label are English, German, Finnish and French, and they represent the minimum set for acceptance of a Class 1 product in most European countries.



## Product Information

[GLM](#)

[GBIC](#)

[1 x 9 Transceiver](#)

[Small Form Factor Transceiver](#)

### GLM

The optical GLM is a single port communications card. Each communication port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser diode of gallium aluminum arsenide (GaAlAs). This material emits in the wavelength range of 770 to 860 nanometers for shortwave and 1270 to 1355 nanometers for long wave, and are commonly referred to as short wavelength (SW) or long wavelength (LW) lasers. The discrete laser diodes are classified as Class 3B laser products. Once they are incorporated into the GLM, the product's automatic power control maintains the average power launched into a fiber at a value below the Class 1 limit.

**Note** OFC GLMs are found only on the LP6000. Any reference to OFC or non-OFC products applies only to the LP6000, and not to other HBA models.

For OFC GLMs (Open Fiber Control) the optical fiber link between two GLM ports is continuously monitored by the open fiber link detection and laser safety control system (OFC). In the event of a break anywhere in the path, this control system prevents laser emissions from exceeding Class 1 levels. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed on any GLM accessory.



## **GBIC**

The optical GBIC is an integrated duplex data link for bi-directional communications over multimode or single mode optical fiber. Each GBIC consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser emitting in the wavelength range of 770 to 860 nanometers for shortwave length GBICs and 1270 to 1355 nanometers for long wavelength GBICs. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed the GBIC.

## **Small Form Factor Transceiver**

The small form factor transceiver is an integrated duplex data link for bi-directional communications over multimode or single mode optical fiber. Each small form factor transceiver consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser emitting in the wavelength range of 770 to 860 nanometers for shortwave length small form factor transceivers and 1270 to 1355 nanometers for long wavelength small form factor transceivers. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed the small form factor transceiver.

## **1x9 Transceiver**

The 1x9 transceivers is an integrated duplex data link for bi-directional communications over multimode fiber. Each 1x9 consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser emitting in the wavelength range of 770 to 860 nanometers for shortwave 1x9s. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed the 1x9 transceiver.

## Usage Restrictions

Failure to comply with these usage restrictions may result in incorrect operation of the system and could possibly lead to points of access that may emit laser radiation levels above the Class 1 limits established in the U. S. by the DHHS and within Europe by EN60825–1/EN60825–2.

[GLM](#)

[GBIC](#)

[1 x 9 Transceiver](#)

[Small Form Factor Transceiver](#)

### GLM

The GLM is designed and certified for applications using point-to-point optical fiber links only. Use of the product with multiple input or multiple output optical links (for example, star couplers) is prohibited since it is incompatible with the GLM's certification.

The GLM will not allow normal data transmission on the optical link unless it is connected to another similar GLM or compatible laser product. For OFC GLMs, another manufacturer's laser product is not considered compatible unless it contains the open fiber link detection and laser safety control system (OFC) and is properly certified as a Class 1 laser product. Similarly, for non-OFC GLMs, a compatible laser device must be non-OFC.

Any system level product that incorporates the GLM must provide power supply protection that guarantees a voltage of 6.0 volts or less at the GLM. The functional power supply range of the GLM product is specified as 4.75 to 5.25 volts typically. Operation outside of this range may degrade the performance and lifetime of the GLM. The GLM will remain operational with laser emissions below Class 1 limits provided the power supply level at the adapter remains at or below 6.0 volts. If the power supply level rises above 6.0 volts, the GLM cannot be guaranteed to operate correctly and could result in laser emissions that may exceed Class 1 limits.

### GBIC

Short wavelength and long wavelength GBICs allow normal data transmission on the optical link when they are connected to another compatible laser product. Short wavelength and long wavelength GBICs sold by Emulex as accessories are non-OFC devices. For non-OFC links, a compatible laser device must be non-OFC and certified as a Class 1 laser product.

## **1 x 9 Transceiver**

Short wavelength 1x9 transceivers allow normal data transmission on the optical link when they are connected to another compatible laser product. Short wavelength 1x9s embedded in Emulex host adapters are non-OFC. For non-OFC links, a compatible laser device must be non-OFC and certified as a Class 1 laser product.

## **Small Form Factor Transceiver**

Short wavelength and long wavelength small form factor transceivers allow normal data transmission on the optical link when they are connected to another compatible laser product. Short wavelength and long wavelength small form factor transceivers embedded in Emulex host adapter are non-OFC. For non-OFC links, a compatible laser device must be non-OFC and certified as a Class 1 laser product.

Any system level product that incorporates the small form factor transceivers must provide power supply protection that guarantees a voltage of 5.0 volts or less at the small form factor transceivers. The functional power supply range of the small form factor transceivers product is specified as 3.135 to 3.465V typically. Operation outside of this range may degrade the performance and lifetime of the transceiver. The transceiver will remain operational with laser emissions below Class 1 limits provided the power supply level at the adapter remains at or below 5.0 volts. If the power supply level rises above 5.0 volts, the small form factor transceiver cannot be guaranteed to operate correctly and could result in laser emissions that may exceed Class 1 limits.

## **System Level Certification**

All GLMs and GBICs sold as accessories by Emulex or host adapters containing embedded 1x9 or small form factor transceivers are certified as Class 1 laser products within the U.S. and Class 1 laser component assemblies outside of the U.S. Manufacturers of products properly incorporating the GLM, GBIC, 1x9 or small form factor transceiver do not need to recertify their product for laser safety. The procedure for full system certification is therefore identical to that used for any other electronic system. When applying for system level certification to electronic standards such as IEC950, the regulatory engineers may want to see the DHHS and European conformity labeling on the GLM, GBIC, 1x9 or small form factor transceiver, and the system level documentation and labeling. Copies of the certificate of conformity for any GLM, GBIC, 1x9 or small form factor transceiver sold by Emulex can be obtained upon request from Emulex Corporation, Costa Mesa.